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D E C I S I O N
of 15 July 1997

Case Number: T 0929/93 - 3.3.2

Application Number: 84308001.1

Publication Number: 0145350

IPC: C03C 1/00

Language of the proceedings: EN

Title of invention:
Vitrification of asbestos waste

Patentee:
M & G Hill (Environmental Engineers) Limited

Opponent:
Beteiligungen Sorg GmbH und Co.KG

Headword:
Vitrification/HILL

Relevant legal provisions:
EPC Art. 123, 56, 54

Keyword:
"(Main request) and (auxiliary request) novelty - yes - generic disclosure does not take away novelty of a specific example"
"(Main request) - inventive step - no - obvious to try an analogous process in order to make a method commercially feasible"
"(Auxiliary request) - technical problem shifted - remittal to the first instance"

Decisions cited:
-

Catchword:

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0929/93 - 3.3.2

D E C I S I O N
of the Technical Board of Appeal 3.3.2
of 15 July 1997

Appellant: (Opponent)
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Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 31 August 1993 rejecting the opposition filed against European patent No. 0 145 350 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: P. A. M. Lançon
Members: U. Oswald
R. E. Teschemacher

Summary of Facts and Submissions

I. European patent No. 0 145 350 was granted on the basis of 10 claims contained in European patent application No. 84 308 001.1. Claim 1 as granted reads as follows:

"1. A process for converting waste asbestos into a glass which comprises providing an enclosed processing system including an electrical glass melting furnace (5) having within it a body of molten glass maintained at a temperature above the decomposition temperature of asbestos; supplying the asbestos and cullet or glass-making materials to the furnace by conveyor means (2) discharging above the body of molten glass in the furnace so that the asbestos enters the body of molten glass and is converted into glass; and withdrawing molten glass (9) from the furnace at a temperature of at least 1000°C."

II. Opposition was filed against the granted patent by the Appellant. According to the grounds of opposition, the patent was opposed for lack of novelty and lack of inventive step under Article 100(a) EPC. Of the numerous documents cited during the opposition only the following remain relevant to the present decision:

US-Re-15727	[*Crossley*]
US-A-4299611	[*Penberthy*]
FR-A-2398704	[*Santt*]

The *Crossley* and *Santt* documents were mentioned in the application originally filed, were already cited in the European Search Report and were taken into account during the examination procedure.

III. By a decision delivered orally on 29 June 1993 with the written reasons posted on 31 August 1993, the Opposition Division rejected the opposition under Article 102(2) EPC.

With the exception of the *Penberthy* document, the Opposition Division decided to disregard a set of documents "A to ME" filed by the Opponent after expiry of the opposition period.

The decision under appeal held that only the *Crossley* and the *Penberthy* document came closest to the subject matter of the patent in suit.

Since *Crossley* did not disclose the temperature above 900°C necessary to decompose asbestos and since *Penberthy* did not relate to asbestos materials, the subject matter according to claim 1 as granted was regarded as novel.

Turning to the issue of inventive step, the Opposition Division took the view that the problem underlying the patent in suit was on the one hand to provide a process for converting ("chemically destroying") waste asbestos into a material which can be disposed of safely and on the other hand that the process was commercially feasible.

Crossley related in fact to the production of a glassy material but under conditions such that the glass melting temperature was below 900°C and that the incorporated asbestos material retained its original properties as much as possible. In the absence of any worked example in *Crossley*, there was no reason to deviate from the clear teaching not to exceed 900°C.

Although *Penberthy* concerned the same technical field and provided a process which overcame the problem of converting hazardous material by disclosing a method and apparatus suitable for combustible and non-combustible materials under conditions such that the waste material is directed onto a bath of molten glass, this prior art related particularly to a process of converting organic waste materials such as PCB, and neither mentioned nor suggested a process to convert asbestos materials.

The other prior art comprising a well known textbook, experts opinions and documents relating to the USPTO examination procedure in the corresponding case were of less relevance and thus the patent in suit could be maintained in unamended form.

Finally, the Opposition Division refused the Proprietor's request for apportionment of costs under Article 104 EPC.

IV. The Appellant lodged an appeal against the said decision.

Oral proceedings took place on 15 July 1997 during which the Respondent filed an auxiliary request. Claim 1 of the auxiliary request reads as follows:

"1. A process for converting waste asbestos into a glass which comprises providing an enclosed processing system including an electrical glass melting furnace (5) having within it a body of molten glass maintained at a temperature above the decomposition temperature of asbestos; supplying the asbestos and cullet or glass-making materials **and sodium hydroxide as a melt accelerator** to the furnace by conveyor means (2) **wherein the material supplied to the furnace comprises**

20-79,5% by weight asbestos, 79,5%-20% cullet and 0,5-5% sodium hydroxide, the total amount of the asbestos, cullet and sodium hydroxide not exceeding 100%, discharging above the body of molten glass in the furnace so that the asbestos enters the body of molten glass and is converted into glass; and withdrawing molten glass (9) from the furnace at a temperature of at least 1000°C."

[Emphasis added in order to indicate the features distinguishing this claim over claim 1 as granted (main request).]

V. The arguments of the Appellant, both in the written procedure and at the oral proceedings, may be summarised as follows:

Since the person skilled in the art, reading *Crossley* and taking into account the general background knowledge in glass industry, would include a temperature of above 900°C, a continuous process, an electric furnace and conveyor means as being within the teaching of this prior art, claim 1 as granted lacked novelty.

Furthermore, since *Penberthy* described a process for converting hazardous material including each of the process steps in claim 1 as granted and since at the priority date of the patent in suit everybody knew that asbestos was a hazardous material, the subject-matter of claim 1 as granted also lacked novelty over this prior art.

On condition that the novelty of the subject matter of claim 1 as granted were to be accepted, the Appellant agreed to the assessment of inventive step starting from the *Santt* document as the closest prior art. He

argued that the problem of conversion of asbestos into a non-toxic glass had already been solved by the vitrification process as proposed by *Santt*. This prior art contained a clear teaching as to the working conditions such as the decomposition temperature to be adjusted and the glass making materials to be added to the asbestos waste. Accordingly, taking the disclosure of *Santt* and *Penberthy* together, it did not need the faintest thinking of the average technician to come to the totality of features of claim 1 as granted.

A similar reasoning would apply on the basis of a combination of the disclosures in *Crossley* and *Penberthy*.

Having regard to Figure 3 and the worked examples in the patent in suit it was also clear that inventiveness of the claimed process could not be based on the manufacture of a transparent glass material like window glass. It was common general knowledge that in the absence of any ratio of the components of the composition to be converted into a glass, claim 1 according to the main request covered products which could not be distinguished from those known from *Santt* and even covered products which could not be commercially used. Claim 1 according to the auxiliary request merely comprised the melt accelerator sodium hydroxide and an extra charge in the form of cullet, components which found common use in the glass industry. Moreover, there was no evidence from the worked examples of the patent in suit that the weight ratio of the components and the range of 0.5 to 5% sodium hydroxide according to the auxiliary request would lead to a particular useful product.

Having regard to the Opposition Division's decision under Article 114(2) EPC, the Appellant took the view that the balance with respect to regarded and disregarded documents was disturbed, which would justify a refund of the appeal fee.

VI. The Respondent refuted the above arguments. In particular it was pointed out that a generic disclosure did not usually take away the novelty of any specific example falling within the terms of that disclosure. Accordingly, the disclosure of a furnace could not destroy the novelty of an electric furnace.

Moreover, *Crossley* did not teach the conversion of waste asbestos into a glass but taught the expert to carefully and under all circumstances avoid decomposition of asbestos to produce molten glass below a temperature of 900°C containing asbestos in the form of a composite, and as a consequence *Crossley* taught maintaining the typical properties of asbestos in the final product. Accordingly, it was wrong to conclude that *Crossley* disclosed the production of a transparent glass material by way of converting waste asbestos.

As regards the relevance of *Penberthy*, it was pointed out by the Respondent that the Appellant in a philological approach selected passages arbitrarily to change the meaning of the technical term "converting waste material" in his line of argument that the prior art "wants" to convert waste material. *Penberthy* was clearly focused on a process of breaking down combustible organic material into an ash component and a gaseous component. Moreover, it was abundantly clear from the context that "converting to a harmless condition" meant in relation to the presence of non-combustible material according to *Penberthy* "capture in the end product" as actually disclosed for e.g. limestone or metal scrap.

Turning to the issue of inventive step, the Respondent put particular emphasis on the fact that because of the dangerous and difficult problems of treating waste asbestos (which produces deadly dust) before the priority date of the patent in suit, the expert would be prevented from considering asbestos as raw material in any glass making process and thus the mere reference to a conversion of waste asbestos into a glass would establish inventiveness over the prior art. The Respondent did not contest the disclosure of *Santt* as to the pollution of the environment caused by asbestos containing materials and agreed to take into account *Santt* as the closest prior art, but took the view that *Santt* and also *Crossley* simply used "natural" mine waste which was quite different from the industrial asbestos-waste the patent in suit dealt with. Having regard to the difference in materials used, there was no possibility of comparing the worked examples according to the patent in suit with those in the prior art. Claim 1 as granted clearly related to a glass within the usual technical meaning thereof as a material for use, whereas *Santt* described the vitrifying of minerals into a glassy status. As a final product, *Santt* made reference to ceramic materials which a person skilled in the art would never classify as a glass within its usual technical meaning. In any case, the skilled person would not take account of vitrification and glass making as synonyms.

One of the advantages of the process according to the patent in suit was that the expert had the freedom of using any suitable mixture in order to produce a variety of industrially applicable glass materials, one of which could be a transparent window glass.

The disclosure of *Santt* did not imply such advantages, nor did it allow the expert to carry out the process in an electrical furnace because of the presence of high amounts of iron oxides, nor did it comprise a positive teaching on carrying out the conversion process under conditions such that the vitrifying temperature was to be maintained above the decomposition temperature of asbestos, nor did it contain any technical information on an optimisation of the process by an additional charge of cullet.

Claim 1 according to the auxiliary request contained additional features which would allow an expert, by changing only three parameters, to produce a clear glass. None of the prior art documents rendered such a process obvious.

VII. In response to an inquiry by the Board of Appeal, neither the Appellant nor the Respondent raised any objections to the case being remitted, if the Board considered this necessary.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be revoked. He maintained his written request that reimbursement of the appeal fee be ordered but refrained from giving a more detailed reasoning for this request in oral proceedings.

The Respondent requested that the appeal be dismissed, and that the patent be maintained as granted (main request). Alternatively, he requested that the patent be maintained on the basis of claim 1 as submitted during the oral proceedings, claims 2 to 4 and 9 to 10 as granted [but] renumbered, and [with] claims 5 to 8 as granted deleted (auxiliary request).

Reasons for the Decision

1. The appeal is admissible.

Main request

2. The Appellant made no objection under Article 100(c) EPC and the Board considers that the requirements of Article 123(2) and (3) EPC are satisfied.

3. Having regard to the objections of the Appellant, the novelty of claim 1 as granted must be considered *vis-à-vis* the disclosure of *Crossley* and *Penberthy*.

3.1 In order to decide the issue of novelty, individual citations must be regarded separately, and compared individually with the alleged invention. A generic disclosure does not usually take away the novelty of any specific example falling within the terms of that disclosure and generally known equivalents of what is actually disclosed in a prior document are not to be taken into account.

3.2 Although the Appellant made reference to numerous documents, including several declarations by experts, in order to demonstrate the common general knowledge in the field of glass making, there is no evidence on file that a person skilled in the art would **inevitably** make use of an electrical furnace when carrying out the *Crossley* process. Moreover, the description of the patent in suit contains on page 2, lines 53 to 55, a reference to other kinds of glass melting furnaces such as top fired gas furnaces. As regards the disclosure of *Penberthy*, the Appellant was unable to show which passage of the document **specifically** related to waste material containing asbestos.

3.3 Accordingly, the disclosure of either "a suitable furnace" in *Crossley* page 2, line 2, or the mention of "hazardous material" or "potentially harmful waste material" in *Penberthy* column 4, lines 54 to 57 and claim 1, cannot take away the novelty of the subject matter of claim 1 as granted referring to a processing system including an electrical glass melting furnace in a process for converting waste asbestos.

4. Taking into account the technical matter discussed at the appeal stage, the Board considers the *Santt* document to be the closest state of the art. This was not disputed by the parties at the oral proceedings.

4.1 *Santt* is concerned with a process for thermal treatments of the tailings of asbestos mines and products obtainable therefrom. It is stated that such tailings contain up to 15% of residual asbestos fibres whose dispersion in the atmosphere constitutes a permanent pollution of the environment. Thermal treatments, inter alia vitrification, of waste asbestos are proposed in which the contained fibres are assumed as soon as the temperature of 600°C is exceeded to destroy (see page 1, lines 1 to 11).

According to *Santt*, the vitrification process is carried out by mixing the tailings with alkaline or fluorinated fluxes, blast furnace slags, lime etc., in proportions of components such that for economical reasons the thermal treatment takes place at temperatures not exceeding 1300°C. For practical use in industry, inter alia iron rich glass ceramics are mentioned as one of the products of the vitrification process. It is indicated that during the vitrification process the iron oxide lowers the melting point and that rapid devitrification **of the glass formed** [emphasis added] during the controlled cooling takes

place. The glass ceramics are inter alia useful for sanitary castings etc. A composition comprising serpentine, iron oxide, lime and sodium carbonate forming a fluid glass at 1270°C is exemplified in Test No. 29 and 30 on page 10 (see page 4, lines 5 to 10 in combination with page 7, lines 5 to 12; page 4, line 29 up to page 5, line 2; page 5, lines 27 to 31 and page 7, lines 33 to 35).

According to Claims 4 and 5, *Santt* discloses more generally that vitrified materials belonging to the class of glasses and ceramics may be obtained by vitrification of tailings.

4.2 *Santt* does not disclose the description of a complete plant suitable for carrying out the vitrification of waste asbestos on a commercial scale.

4.3 Starting from the disclosure of *Santt*, the problem underlying the patent in suit may thus be seen in providing a commercially feasible process suitable for carrying out vitrification of waste asbestos. The problem is solved by the process set out in claim 1 as granted. Having regard to the flow chart of the process according to Figure 1 and the installation according to Figure 2 as well as the corresponding explanations in the description of the patent in suit, the Board is satisfied that the problem has indeed been solved.

The commercial feasibility of the said process was not contested by the Appellant.

5. It therefore remains for the Board to decide whether or not the said solution would, in view of the citations, have been obvious to a person skilled in the art faced with the problem defined above.

5.1 The Respondent has sought to construe a substantial difference between a process for converting waste asbestos into a glass according to the wording of claim 1 as granted and a process for vitrifying asbestos mine tailings according to *Santt* and has put particularly emphasis on the fact that *Santt* did not contain a positive teaching as to a temperature above the decomposition temperature of asbestos of 900°C. However, in the absence of any definition of the composition or structure of the waste asbestos to be treated, the glass-making materials and the composition of the body of molten glass in claim 1 as granted, the Board can only conclude that claim 1 as granted encompasses the vitrification of asbestos materials to a fluid glass as exemplified in *Santt* for serpentine at a temperature of 1270°C and as proposed for asbestos mine tailings up to a temperature of 1300°C. Accordingly, the Board cannot follow the Respondent's argumentation that on the basis of the mere reference to a conversion of waste asbestos into a glass, inventiveness over the prior art is established.

5.2 The Board is convinced that an expert familiar with the solution of problems relating to pollution of the environment, reading *Santt* and missing any disclosure of a plant suitable to carry out the vitrification on a commercially scale, would first of all turn to other prior art relating to a plant especially designed to destroy hazardous waste material under non-polluting conditions and thus would consider the *Penberthy* document.

Penberthy provides for molten glass at an operating temperature between about 1900°F and 2700°F, preferably at about 2300°F (1038°C and 1482°C, preferably 1260°C) in an enclosed, horizontally extending conversion chamber including an electrical furnace to maintain the

glass in the molten state. Waste material, which is combustible, partially combustible or even substantially non-combustible, is fed down a chute through a rear feed opening onto the rear portion of the molten glass. Particulate glass material, such as crushed bottle glass, is retained in a hopper and selectively fed by a screw conveyor into a feed opening at the rear end of the upper portion of the conversion chamber. At the front end of the conversion chamber there is a discharge spout at the lower end of the front wall including a gate valve which is selectively closed or opened to discharge at periodical intervals molten glass into a cooling area (see column 2, lines 11 to 14, lines 28 to 37; column 5, lines 18 to 32; column 4, lines 1 to 23, lines 54 to 61; column 6, lines 33 to 35 and Figure 1).

The Respondent is right when arguing that *Penberthy* is preferably concerned with conversion of organic waste materials in such a manner that the molten glass at a high temperature causes the waste material to be broken down into an ash component and a gaseous component (see column 2, lines 36 to 42). However, taking into account that *Santt* has already recognised the problem relating to the pollution of environment caused by asbestos containing materials and has proposed carrying out a vitrification process under conditions such that a molten glass from these materials is produced, and taking into account the temperatures for vitrification and conversion exemplified in *Santt* and *Penberthy*, the Board can only conclude that a person skilled in the art would have no difficulties and **would at least try with a certain expectation of success** to carry out the *Penberthy* process in an **analogous manner** to vitrify waste asbestos materials, and would thus arrive at the process according to claim 1 as granted without the exercise of inventive skill.

5.3 Even assuming that *Santt* itself would not give any incentive to maintain the temperature of the molten glass above the decomposition temperature of asbestos - which assumption is a more exotic one in the Board's view - the undisputed fact is that at the priority date of the patent in suit the health risk of asbestos fibres and asbestos containing materials and the problem of their non-toxic waste management was well known to the general public owing to widespread debate thereon, and thus no inventive step could be seen in any case in the provision of a working temperature at which asbestos is converted into a non-toxic status.

Also assuming, in an unrealistic manner, that *Penberthy* alone would not give any incentive to discharge the molten glass from the furnace at a temperature of at least 1000°C, having regard to the operating temperatures of the molten glass and the clear teaching on discharging the molten glass through an opening at the bottom of the conversion chamber according to *Penberthy,* in combination with the common general knowledge about viscosity problems relating to glass in a fluid or molten status, it is clearly an obvious measure to maintain the temperature of the discharged molten glass above 1000°C, above which it is undisputed that molten glass can be handled easily.

5.4 The Board notes that the Respondent did not contest the commercial feasibility of the *Penberthy* process.

5.5 From the foregoing, it must be concluded that the subject matter of claim 1 as granted would have been obvious in the light of the cited prior art. An inventive step within the meaning of Article 56 EPC must be denied. Dependent claims 2 to 10 as granted must fall with claim 1.

Accordingly, the Respondent's main request has to be rejected.

Auxiliary request

6. The Board sees no objection under Article 84 EPC to amended claim 1 of the auxiliary request, based only on a combination of claims as granted.

7. Claim 1 of the auxiliary request is based on claims 1 and 5 to 8 as granted with a limitation to sodium hydroxide as melt accelerator (claims 1 to 3, 7 to 10 originally filed with limitation to sodium hydroxide as melt accelerator and page 2, lines 11 to 14 originally filed; the limitation to 79.5% asbestos and 79.5% cullet finds support on page 3, lines 30 to 32 originally filed by the measure that **up to** 80% by weight of the material fed may be asbestos, **the balance being** cullet and melt accelerator; the claimed process steps find further support in Figure 1 and corresponding explanations in the description originally filed). Having regard to the limitations set out above, claim 1 of the auxiliary request manifestly does not extend the protection conferred. The requirements of Article 123(2) and (3) are accordingly satisfied.

8. In view of the limitations in claim 1 of the auxiliary request, it is enough to state that in the absence of other prior art coming closer to the claimed subject matter, the considerations under point 3 above concerning the main request apply here as well and that, consequently, the requirements of Article 54(1) EPC are met.

9. The Respondent has argued that on the basis of the ratio between asbestos, sodium hydroxide and cullet,

forming the limitation in claim 1 of the auxiliary request, a person skilled in the art would get all the information necessary to produce a clear glass material. However, having regard to the results of the batch melting trials as set out in Table 1 and Table 2 of the patent in suit and originally filed, particularly those of the so-called "Reference" "C" and "G", showing that good results can only be expected for a sodium hydroxide content of at least 10%, there appears to be no evidence that a sodium hydroxide content of between 0.5% and 5% of the material supplied to the furnace - the limitation for the melt accelerator in claim 1 of the auxiliary request - allows a clear glass material to be produced.

In any case, the technical matter relating to particular advantages to be achieved by the addition of certain amounts of a specific melt accelerator as set out on page 2, lines 42 to 48, of the patent specification (page 3, lines 1 to 12, of the description as originally filed) has not been discussed extensively during the procedure before the Opposition Division.

It does not seem appropriate at the present stage of the appeal proceedings to carry out a new investigation of the case including a discussion of the claimed subject matter in the light of a problem which has shifted away from that discussed in the context of the main request. Accordingly, since the limitations in claim 1 of the auxiliary request can be regarded as a clear consequence of technical matter discussed for the first time at the appeal stage and since the parties would be deprived of an instance of jurisdiction on this matter, the Board has decided to invoke its powers under Article 111(1) EPC and to remit the case to the Opposition Division with the order to resume examination on the newly filed claims.

10. As regards the Appellant's request to refund the appeal fee, the Board notes that it was within the discretion of the Opposition Division to decide on the admissibility of the late filed evidence. The Opposition Division did not simply disregard the late filed evidence. Rather they came to the conclusion that out of the late filed documents A-ME only K (*Penberthy*) was considered relevant and that the rest was of less relevance than other evidence already taken into consideration. The Appellant has not established that this assessment was arbitrary. Whereas he has alleged that late filed documents from the Proprietor were accepted to which he had not an appropriate opportunity to react, he did not point to any specific document on which the decision under appeal was based in respect of which relevant evidence from his side was disregarded. In addition, no reason was given why it had not been possible to file documents A to ME earlier in the proceedings which were actually filed roughly 1 month before the oral proceedings in first instance.

Since in the judgment of the Board, there was no procedural violation on the part of the Opposition Division, there can be no question of refunding the appeal fee.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance for further prosecution on the basis of the auxiliary request:

   Claim 1 as submitted during the oral proceedings,
   Claims 2 to 4, and 9 to 10 as granted renumbered,
   Claims 5 to 8 as granted deleted.

3. The request for reimbursement of the appeal fee is refused.

The Registrar: The Chairman:

E. Görgmaier P. A. M. Lançon